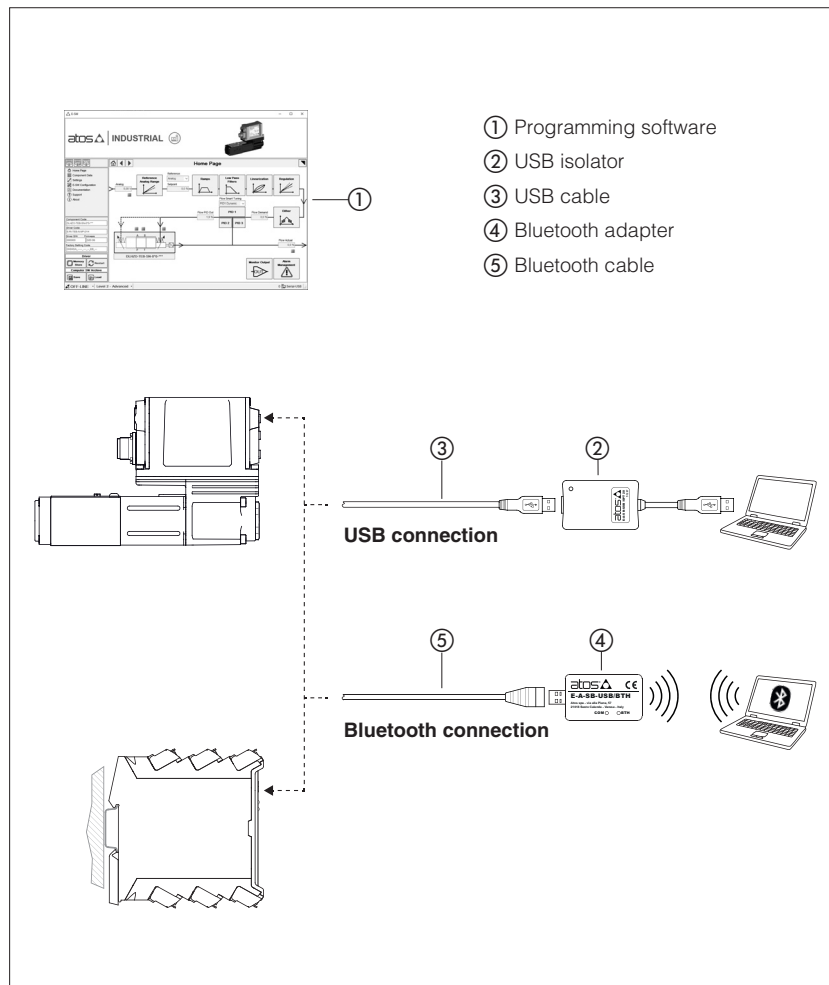# Programming tools for valve drivers & axis controls

Atos PC software, USB adapters, cables and terminators

① Programming software
② USB isolator
③ USB cable
④ Bluetooth adapter
⑤ Bluetooth cable

USB connection

Bluetooth connection

The E-SW and Z-SW programming software are supplied in USB memory stick format and can be easily installed on a desktop or a notebook computer.

The intuitive graphic interface allows:
- set up valve's functional parameters
- verify the actual working conditions
- identify and quickly solve fault conditions
- adapt the factory preset parameters to the application requirements
- store the customized setting into the valve driver or axis control
- archive the customized setting into the PC

The graphic interface is organized in pages related to different specific groups of functions and parameters.

The software automatically recognizes the connected valve model and adapts the displayed parameter groups, according to the selected access level.

The software is available in different versions according to the valve driver and axis control communication interfacing.

Fieldbus communication software includes also dedicated manuals and configuration files for user self management of the Atos electronics, using a fieldbus master.

Features:
- automatic valve recognition
- multilevel graphic interface
- numeric parameters settings (scale, bias, ramp, linearization, dither, etc.)
- real-time parameters modification
- diagnostic and monitor signals
- preset data storing into permanent memory
- internal oscilloscope function
- internal database of customized preset

USB memory stick contents:
- software installer
- user and fieldbus communication manuals
- IO-Link and fieldbus configuration files

---

1 **PROGRAMMING SOFTWARE**

Valve driver and axis control functional parameters can be easily set up respectively with E-SW and Z-SW programming software using proper connection to the digital electronics.

E - SW	-	BASIC	/	*	-	*

E-SW = for valve drivers

Valve drivers supported communications:

BASIC = NP (USB)   IL (IO-Link)   PS (Serial)   IR (Infrared)

FIELDBUS = BC (CANopen)   BP (PROFIBUS DP)   EH (EtherCAT)
EW (POWERLINK)   EI (EtherNet/IP)   EP (PROFINET)

Notes: E-SW-FIELDBUS supports also valve drivers without fieldbus communication;
E-SW-*/PQ supports also valve drivers without P/Q control

Option:
PQ = for valve drivers with alternated P/Q controls SP, SF, SL

Supplies:
- = first supply
N = next supply

Z - SW	-	FULL	-	*

Z-SW = for axis controls

Axis controls supported communications:

FULL = NP (USB)   PS (Serial)
BC (CANopen)   BP (PROFIBUS DP)   EH (EtherCAT)
EW (POWERLINK)   EI (EtherNet/IP)   EP (PROFINET)

Supplies:
- = first supply
N = next supply

1.1 Programming software versions

Different software versions are available according to the valve drivers and axis controls type to be connected and communication interface.

Note: the E-SW and Z-SW software are supplied in USB memory stick format; E-SW-BASIC software can be free downloaded from the Atos website

Web download, free programming software:

E-SW-BASIC	The software can be downloaded from MyAtos area upon web registration at www.atos.com:
	- technical assistance for the software not included
	- USB memory stick not included

USB memory stick first supply of programming software, to be ordered separately:

E-SW-BASIC	The software can be activated from the MyAtos area after web registration on www.atos.com using the serial number
E-SW-BASIC/PQ	printed into the USB memory stick plastic box:
E-SW-FIELDBUS	- technical assistance for the software included for 1 year, starting from web registration;
E-SW-FIELDBUS/PQ	the access to the service may happen by telephone, e-mail, or at the Atos Headquarters
Z-SW-FULL	Upon web registration user receives via email the Activation Code (purchased software license)
	The software remains active for 10 days from the installation date and then it stops until the user inputs the Activation Code.

USB memory stick next supplies of programming software, to be ordered separately:

E-SW-BASIC-N	Available only for supplies after the first, these software cannot be activated from MyAtos area:
E-SW-BASIC/PQ-N	- technical assistance for the software not included
E-SW-FIELDBUS-N	The software can be activated only with the Activation Code received upon **USB memory stick first supply** registration
E-SW-FIELDBUS/PQ-N	and it is recommended only for supplies that require additional USB memory stick physical copies of the software.
Z-SW-FULL-N	

Notes: the E-SW and Z-SW software are NOT interchangeable and have to be ordered separately;
programming software FIELDBUS(/PQ) and FULL can program digital electronics through USB communication port for all industrial and ex-proof executions of valve drivers / axis controls

1.2 USB memory stick contents

Include software installer, user manuals and configuration files for IO-Link and fieldbus:
IODD for IL - EDS for BC - GSD for BP - XML for EH - XDD for EW - EDS for EI - GSDML for EP

1.3 Atos Download Area

Direct access to latest releases of programming software, manuals, USB drivers and fieldbus configuration files in MyAtos area at www.atos.com
An automatic mailing message will inform all the registered users whenever a new software update is available.

1.4 E-SW / Z-SW minimum PC requirements

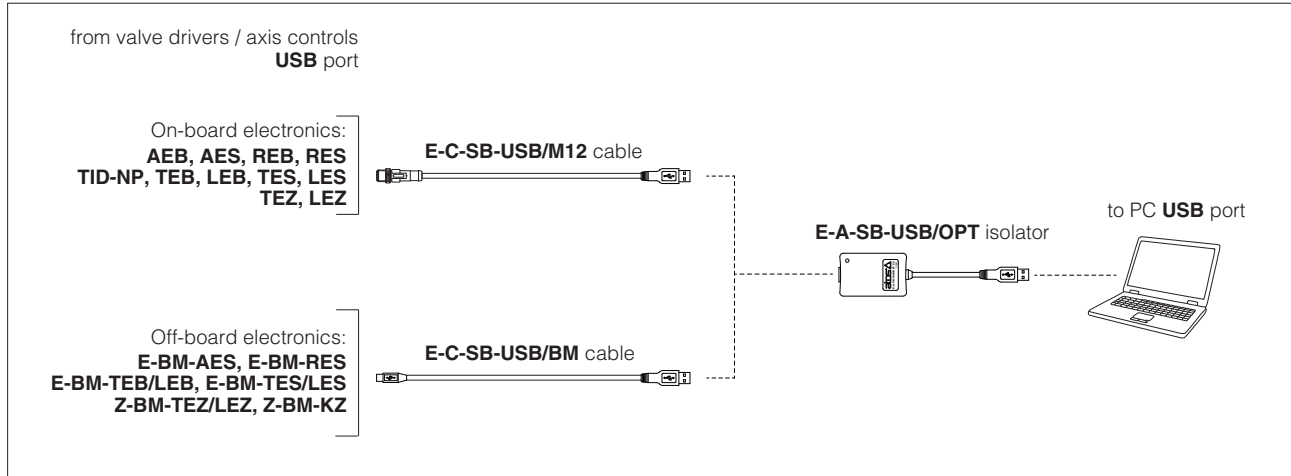|	
Personal Computer	Pentium® processor 1GHz or equivalent
Operating System	Windows XP SP3
Monitor Resolution	1024 x 768
Memory	512 MB RAM + Hard Disk with 250MB free space
Interface	USB port

E-SW / Z-SW software permit the functional parameters programming through USB port **(1)**.

2.1 Connection tools

Isolator and cables shown in the image below can be ordered individually or in a single solution purchasing a dedicated kit: **E-KIT-USB**

from valve drivers / axis controls
USB port

On-board electronics:
**AEB, AES, REB, RES
TID-NP, TEB, LEB, TES, LES
TEZ, LEZ**

E-C-SB-USB/M12 cable

E-A-SB-USB/OPT isolator

to PC **USB** port

Off-board electronics:
**E-BM-AES, E-BM-RES
E-BM-TEB/LEB, E-BM-TES/LES
Z-BM-TEZ/LEZ, Z-BM-KZ**

E-C-SB-USB/BM cable

(1) USB port is not available for on-board TID-BC valve drivers

WARNING: the USB port of valve drivers / axis controls is not isolated and use of USB isolator adapter is highly recommended!
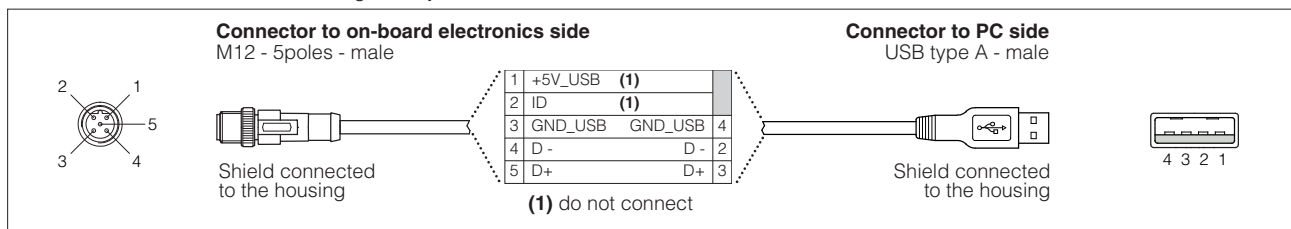Wrong earthing connections may cause high potential difference between GNDs, generating high currents that could damage valve drivers / axis controls or the connected PC.

2.2 E-A-SB-USB/OPT isolator adapter

USB type A, female
to E-C-SB-USB/*

USB type A, male
to PC USB port

55 mm   125 mm
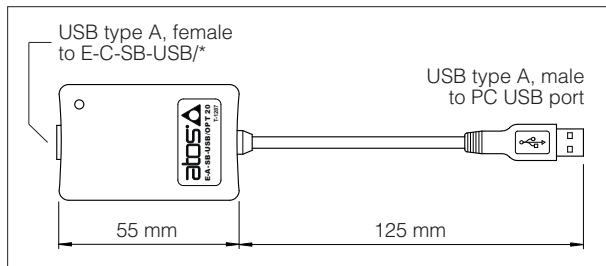
- USB 2.0 Full speed (12 MBps)
- electrical isolation 3 kV
- temperature range, -40°C ÷ +80°C
- external power supply not required
- PC driver not required
- status LED

2.3 E-C-SB-USB/M12 cable - 4 m length - only for on-board electronics

Connector to on-board electronics side
M12 - 5poles - male

Connector to PC side
USB type A - male

1	+5V_USB	**(1)**	
2	ID	**(1)**	
3	GND_USB	GND_USB	4
4	D -	D -	2
5	D+	D+	3

Shield connected
to the housing

(1) do not connect

Shield connected
to the housing

4 3 2 1

2.4 E-C-SB-USB/BM cable - 3 m length - only for off-board electronics
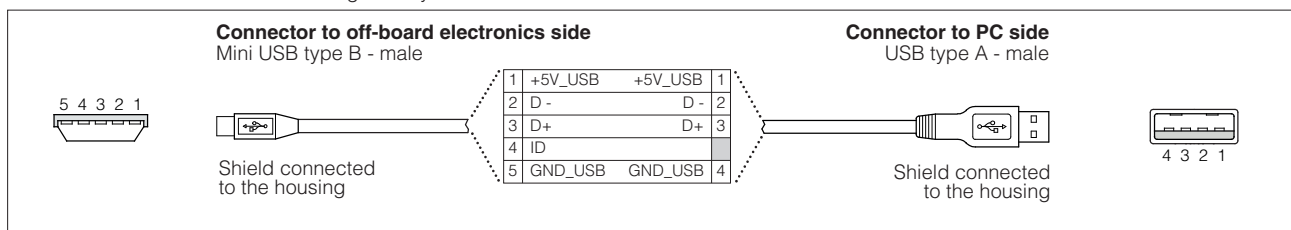
Connector to off-board electronics side
Mini USB type B - male

Connector to PC side
USB type A - male

1	+5V_USB	+5V_USB	1
2	D -	D -	2
3	D+	D+	3
4	ID		
5	GND_USB	GND_USB	4

5 4 3 2 1

Shield connected
to the housing

Shield connected
to the housing

4 3 2 1

E-SW / Z-SW software permit the functional parameters programming through Bluetooth **(1)**.
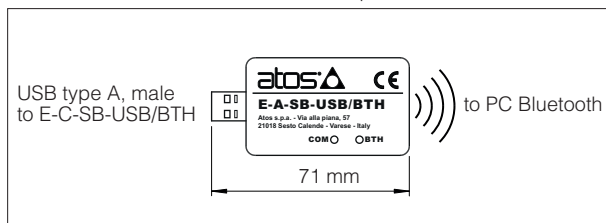
3.1   Connection tools

Adapter and cables shown in the image below can be ordered individually or in a single solution purchasing a dedicated kit: **E-KIT-BTH**

from valve drivers / axis controls
USB port

On-board electronics:
**AEB, AES, REB, RES
TID-NP, TEB, LEB, TES, LES
TEZ, LEZ**

E-C-SB-M12/BTH cable

E-A-SB-USB/BTH adapter

to PC **Bluetooth**

Off-board electronics:
**E-BM-TEB/LEB
E-BM-TES/LES
Z-BM-TEZ/LEZ, Z-BM-KZ**

E-C-SB-BM/BTH cable

up to 10 m

(2)
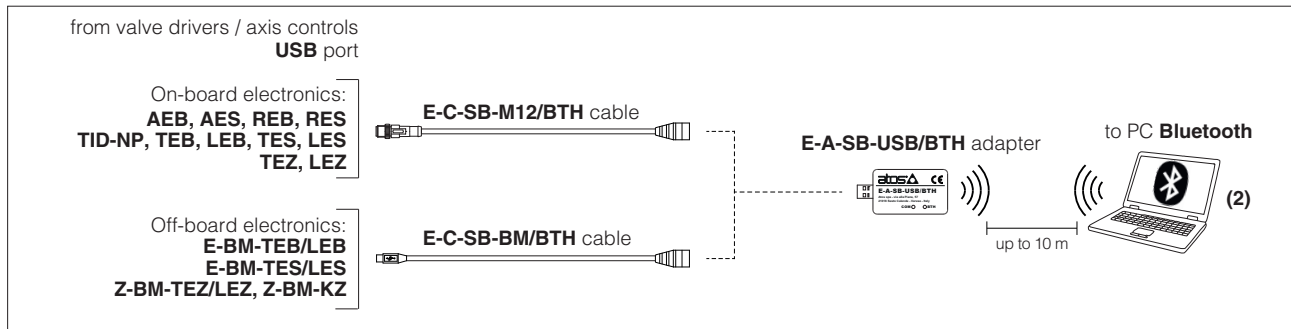
(1) Bluetooth adapter is not compatible with off-board E-BM-AES, E-BM-RES and on-board TID-BC valve drivers
(2) If PC has not built-in Bluetooth, use standard USB to Bluetooth dongle compatible with E-A-SB-USB/BTH specification
     (please refer to STARTUP-BLUETOOTH guide)

3.2   **E-A-SB-USB/BTH** - Bluetooth adapter

USB type A, male
to E-C-SB-USB/BTH

E-A-SB-USB/BTH
Atos s.p.a. - Via alla piana, 57
21018 Sesto Calende - Varese - Italy
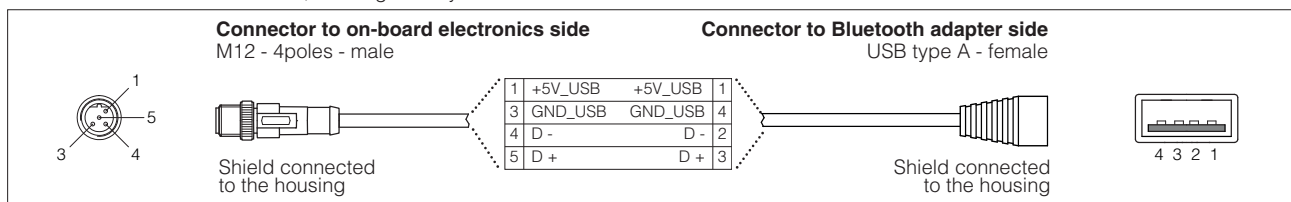COM○ ○**BTH**

to PC Bluetooth

71 mm

- USB male connector, type A
- type of radio interface: Bluetooth Class 2
- temperature range, -20 ÷ +70 °C (storage -40 ÷ +70 °C)
- external power supply not required (from Atos digital electronics only)
- protocol: Bluetooth Classic Version 2.x , 3.x supporting Serial Port Profile
- max RF transmission power: Class 2 Output Power (+1.5 dBm typical)
- frequency: 2.402 GHz to 2.480 GHz
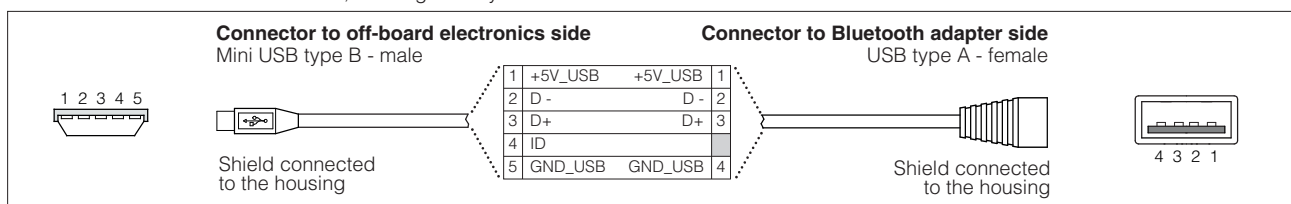- LEDs indicate the actual working condition
- IP20 protection degree

WARNING: Bluetooth adapter is available only for Europe, USA, Canada, China, Japan, India, Korea markets!
Bluetooth adapter is certified according to RED (Europe), FCC (USA), ISED (Canada), SRRC (China), MIC (Japan), BIS (India), KC (Korea) directives

3.3   **E-C-SB-M12/BTH**   cable - 0,4 m length - only for on-board electronics

Connector to on-board electronics side
M12 - 4poles - male

Connector to Bluetooth adapter side
USB type A - female

1	+5V_USB	+5V_USB	1
3	GND_USB	GND_USB	4
4	D -	D -	2
5	D +	D +	3

Shield connected
to the housing

Shield connected
to the housing

4 3 2 1

3.4   **E-C-SB-BM/BTH**   cable OTG - 0,2 m length - only for off-board electronics

Connector to off-board electronics side
Mini USB type B - male

Connector to Bluetooth adapter side
USB type A - female

1 2 3 4 5

1	+5V_USB	+5V_USB	1
2	D -	D -	2
3	D+	D+	3
4	ID		
5	GND_USB	GND_USB	4

Shield connected
to the housing

Shield connected
to the housing

4 3 2 1

The adapter have to be connected to the USB communication port of PC to activate the IR infrared communication interface towards Atos digital electrohydraulics.

4.1   Connection tools

from valve drivers **IR** interface

to PC **USB** port

On-board industrial electronics:
E-MI-AS-IR
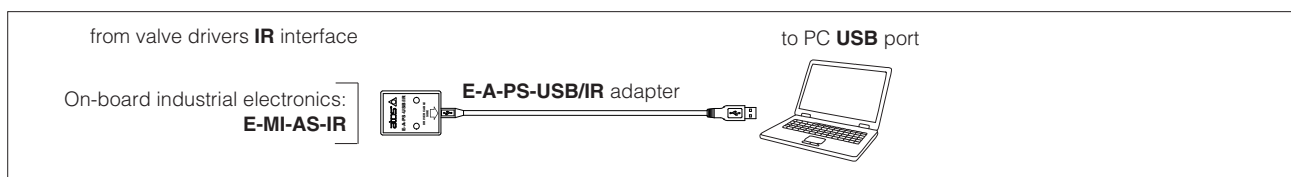
E-A-PS-USB/IR adapter

4.2   **E-A-PS-USB/IR** adapter - 3 m length

Infrared

USB
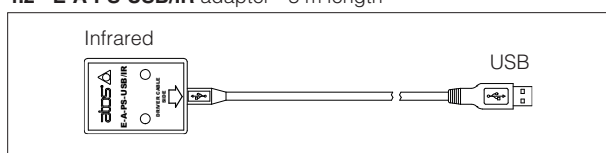
- direct infrared communication with the valve driver
- USB male connector, type A
- plug-in format for direct infrared connection on the valve driver
- transmission rate 9,6 kbit/s
- external power supply not required (USB supply)
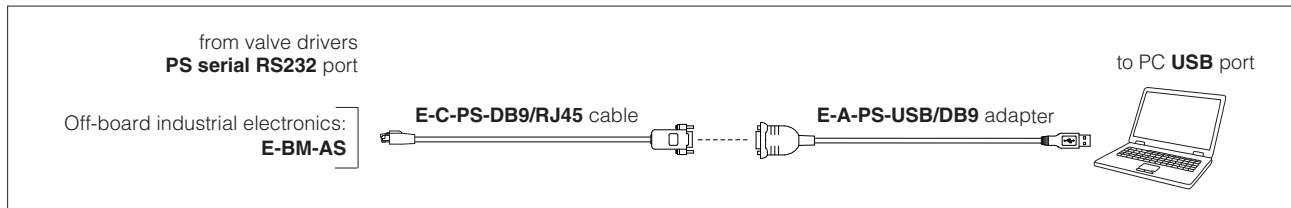
5 **PS serial RS232 - USB COMMUNICATION ADAPTER AND CROSS CABLES** - only for off-board **E-BM-AS** valve drivers
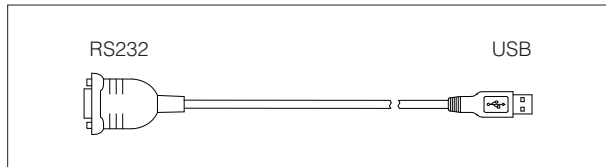
The adapter have to be connected to the USB communication port of PC to activate the PS serial RS232 communication interface towards Atos digital electrohydraulics. The cross cables connect the relevant connector of the USB adapter with the communication port of the valve drivers.

5.1 Connection tools

from valve drivers
PS serial RS232 port

Off-board industrial electronics:
E-BM-AS

E-C-PS-DB9/RJ45 cable

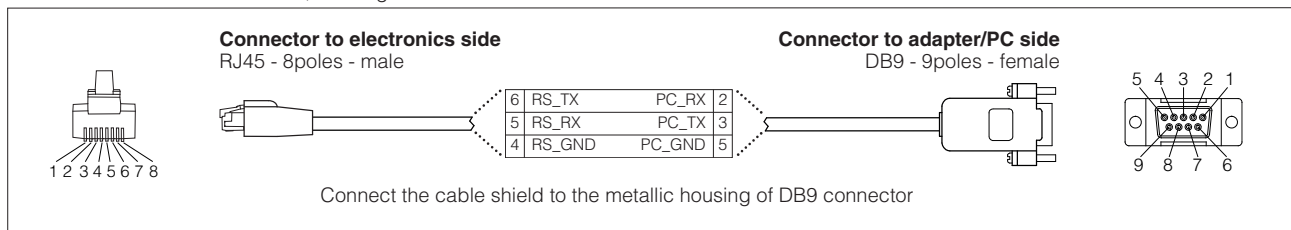**E-A-PS-USB/DB9** adapter

to PC **USB** port

Note: the adapter is not required if PC is already equipped with a serial RS232 communication port

5.2 E-A-PS-USB/DB9 adapter - 0,45 m length

RS232   USB

• DB9 male connector according to serial RS232 specification
• USB male connector, type A
• transmission rate from 1,6 kbit/s up to 225 kbit/s
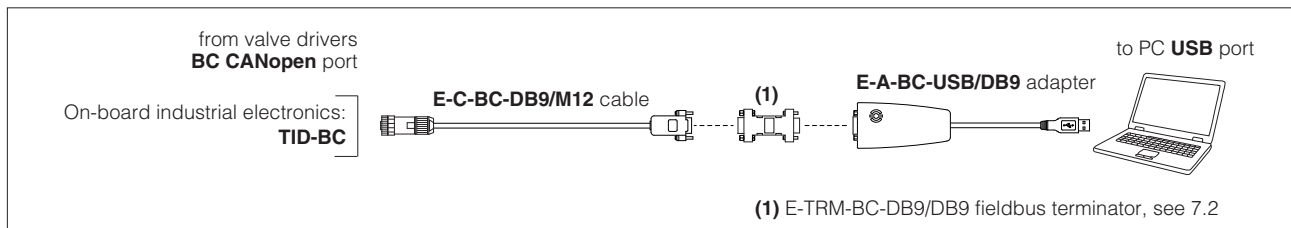• external power supply not required (USB supply)

5.3 E-C-PS-DB9/RJ45 cable - 2,5 m length

Connector to electronics side
RJ45 - 8poles - male

Connector to adapter/PC side
DB9 - 9poles - female

6	RS_TX	PC_RX	2
5	RS_RX	PC_TX	3
4	RS_GND	PC_GND	5

1 2 3 4 5 6 7 8

5 4 3 2 1
9 8 7 6

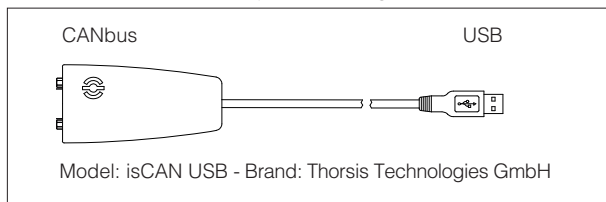Connect the cable shield to the metallic housing of DB9 connector

---

6 **BC CANopen - USB COMMUNICATION ADAPTER AND CROSS CABLES** - only for on-board **TID-BC** valve drivers

The adapter have to be connected to the USB communication port of PC to activate the BC CANopen communication interface towards Atos digital electrohydraulics. The cross cables connect the relevant connector of the USB adapter with the communication port of the valve drivers.

6.1 Connection tools

from valve drivers
BC CANopen port

On-board industrial electronics:
TID-BC

E-C-BC-DB9/M12 cable

(1)

E-A-BC-USB/DB9 adapter

to PC **USB** port

(1) E-TRM-BC-DB9/DB9 fieldbus terminator, see 7.2

6.2 E-A-BC-USB/DB9 adapter - 2 m length

CANbus   USB

• DB9 male connector according to the CiA specification DR303-1
• USB male connector, type A
• transmission rate from 10 kbit/s to 1 Mbit/s
• external power supply not required (USB supply)
• LEDs indicate the actual working condition

Model: isCAN USB - Brand: Thorsis Technologies GmbH

6.3 E-C-BC-DB9/M12 cable - 2 m length

Connector to driver side
M12 - 5 poles - female

Connector to adapter side
DB9 - 9 poles - female

5	CAN_L	2
3	CAN_GND	3
1	CAN_SHLD (SHIELD)	5
4	CAN_H	7
2	CAN_V+	9

1 2
5
4 3

5 4 3 2 1
9 8 7 6

GS500
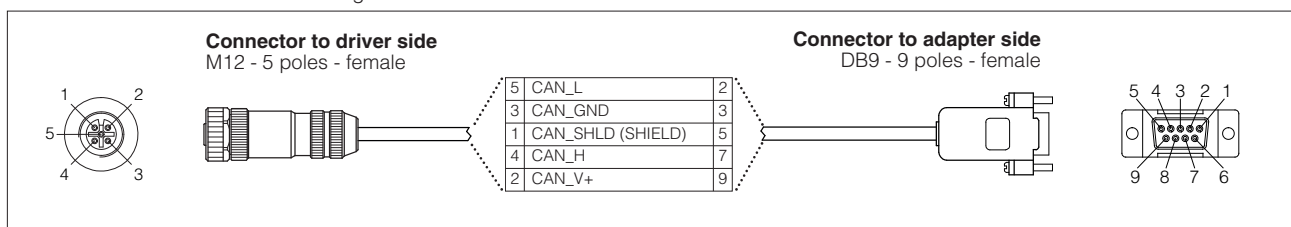
FIELDBUS TERMINATORS - only for **BC** and **BP**

The fieldbus terminators are required when output fieldbus connector has to be used as network end point.

Note: fieldbus terminators not available for ex-proof electronics

E - TRM	-	BC	-	M12	/	5PM

Terminator

Fieldbus interfaces:
BC = CANopen
BP = PROFIBUS DP

Connector:
5PM = to BC executions **(1)**
4PF = to BP executions **(1)**
DB9 = to DB9 connector, cable side **(2)**

Connector:
M12 = from M12 output fieldbus connector **(1)**
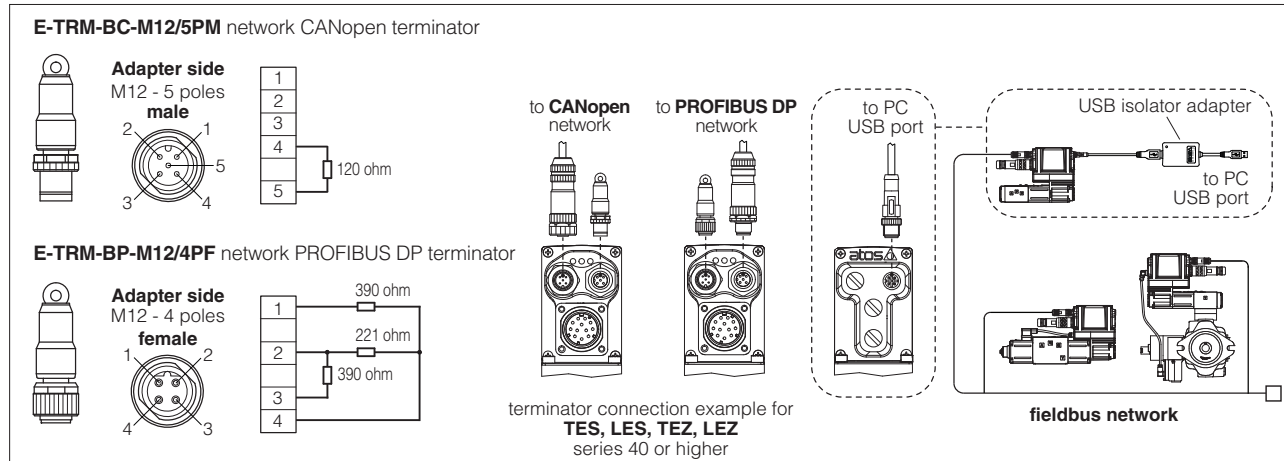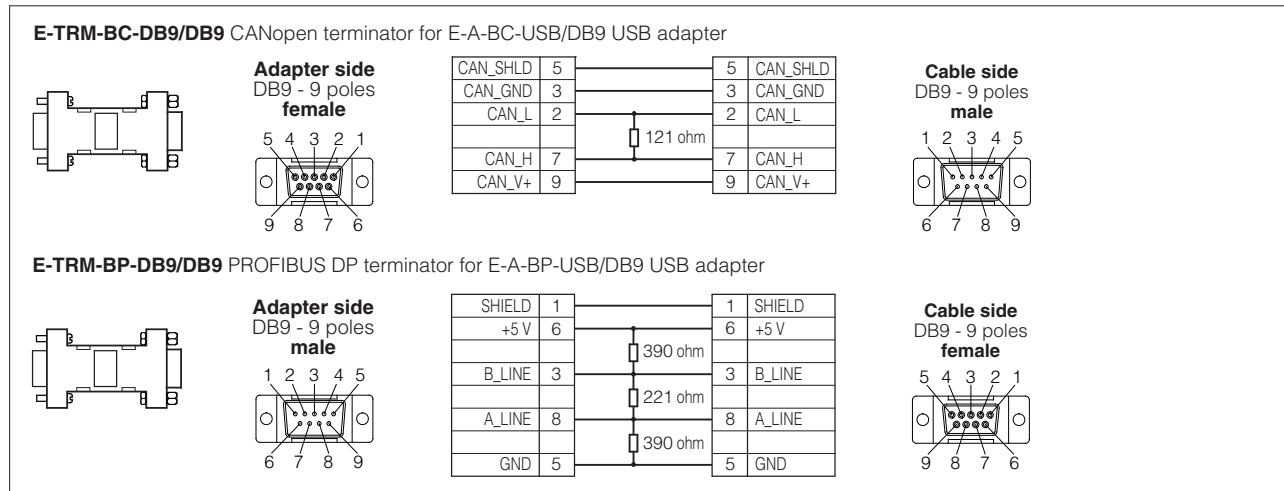**DB9** = from DB9 connector, adapter side **(2)**

(1) for on-board TES, LES, TEZ, LEZ series 40 or higher
(2) for off-board E-BM-AES, E-BM-RES, E-BM-TEB/LEB, E-BM-TES/LES, Z-BM-TEZ/LEZ, Z-BM-KZ and for on-board TID-BC

7.1 M12 terminators

E-TRM-BC-M12/5PM network CANopen terminator

Adapter side
M12 - 5 poles
male

1	
2	
3	
4	120 ohm
5	

E-TRM-BP-M12/4PF network PROFIBUS DP terminator

Adapter side
M12 - 4 poles
female

1	390 ohm
2	221 ohm / 390 ohm
3	
4	

to **CANopen** network   to **PROFIBUS DP** network   to PC USB port   USB isolator adapter   to PC USB port

terminator connection example for
TES, LES, TEZ, LEZ series 40 or higher

fieldbus network

7.2 DB9 terminators

E-TRM-BC-DB9/DB9 CANopen terminator for E-A-BC-USB/DB9 USB adapter

Adapter side
DB9 - 9 poles
female
5 4 3 2 1
9 8 7 6

CAN_SHLD	5		5	CAN_SHLD
CAN_GND	3		3	CAN_GND
CAN_L	2	121 ohm	2	CAN_L
CAN_H	7		7	CAN_H
CAN_V+	9		9	CAN_V+

Cable side
DB9 - 9 poles
male
1 2 3 4 5
6 7 8 9

E-TRM-BP-DB9/DB9 PROFIBUS DP terminator for E-A-BP-USB/DB9 USB adapter

Adapter side
DB9 - 9 poles
male
1 2 3 4 5
6 7 8 9

SHIELD	1		1	SHIELD
+5 V	6	390 ohm	6	+5 V
B_LINE	3	221 ohm	3	B_LINE
A_LINE	8	390 ohm	8	A_LINE
GND	5		5	GND

Cable side
DB9 - 9 poles
female
5 4 3 2 1
9 8 7 6

FIRMWARE UPDATE

It is possible to update the firmware of the following valve drivers and axis controls, using proper USB communication port.
The firmware update is allowed starting from electronics series listed into the table or higher series:

Industrial electronics

E-RI-AEB s10 E-RI-AES s40	E-RI-REB s10 E-RI-RES s10	E-RI-TEB s10 E-RI-LEB s10	E-RI-TES s40 E-RI-LES s40	E-RI-TES-S s40 E-RI-LES-S s40	E-RI-TID-NP s10 **(1)**
E-BM-AES s10	E-BM-RES s10	E-BM-TEB s10 E-BM-LEB s10	E-BM-TES s10 E-BM-LES s10	E-BM-TES-S s10 E-BM-LES-S s10	
Z-RI-TEZ s40 Z-RI-LEZ s40	Z-BM-KZ s10	Z-BM-TEZ s10 Z-BM-LEZ s10			

(1) Firmware update procedure is not available for E-RI-TID-BC

Ex-proof electronics

E-RA-AES s40	E-RA-RES s40	E-RA-TES s40 E-RA-LES s40	E-RA-TES-S s40 E-RA-LES-S s40
Z-RA-TEZ s40 Z-RA-LEZ s40	Z-RA-TEZ-S s40 Z-RA-LEZ-S s40		

9.1 Industrial and ex-proof electronics

	Model Code	Series	Software	Cable	USB Adapter	Terminator
IR	E-MI-AS-IR	11			E-A-PS-USB/IR	
PS	E-BM-AS	10 or higher		E-C-PS-DB9/RJ45	E-A-PS-USB/DB9	
NP	E-BM-AES, E-BM-RES	10 or higher	E-SW-BASIC	E-C-SB-USB/BM	E-A-SB-USB/OPT	
	E-BM-TEB, E-BM-LEB, E-BM-TES, E-BM-LES (1)	10 or higher				
	AEB, REB (1)	10 or higher				
	TID (1)	10 or higher		E-C-SB-USB/M12		
	TEB, LEB (1)	10 or higher				
	TES, LES (1)	40 or higher				
	TES, LES with SP, SF, SL options (1)	40 or higher	E-SW-BASIC/PQ	E-C-SB-USB/BM		
	E-BM-TES, E-BM-LES with SP, SF, SL options (1)	10 or higher				
	TEZ, LEZ (1)	40 or higher	Z-SW-FULL	E-C-SB-USB/M12		
	Z-BM-KZ, Z-BM-TEZ, Z-BM-LEZ (1)	10 or higher		E-C-SB-USB/BM		
IL	TEB, LEB (1)	20 or higher	E-SW-BASIC	E-C-SB-USB/M12		
BC	TID	10 or higher	E-SW-FIELDBUS	E-C-BC-DB9/M12	E-A-BC-USB/DB9	E-TRM-BC-DB9/DB9
BP BC EH	E-BM-AES, E-BM-RES	10 or higher	E-SW-FIELDBUS	E-C-SB-USB/BM	E-A-SB-USB/OPT	
	RES (1)	10 or higher		E-C-SB-USB/M12		
	AES (1)	40 or higher				
BC BP EH EW EI EP	E-BM-TES, E-BM-LES (1)	10 or higher	E-SW-FIELDBUS	E-C-SB-USB/BM	E-A-SB-USB/OPT	
	TES, LES (1)	40 or higher		E-C-SB-USB/M12		
	E-BM-TES, E-BM-LES with SP, SF, SL options (1)	10 or higher	E-SW-FIELDBUS/PQ	E-C-SB-USB/BM		
	TES, LES with SP, SF, SL options (1)	40 or higher		E-C-SB-USB/M12		
	TEZ, LEZ (1)	40 or higher	Z-SW-FULL	E-C-SB-USB/M12		
	Z-BM-KZ, Z-BM-TEZ, Z-BM-LEZ (1)	10 or higher		E-C-SB-USB/BM		

(1) Valve drivers and axis controls compatible with Bluetooth adapter E-A-SB-USB/BTH (see 3.1)

9.2 Obsolete industrial electronics

	Model Code	Series	Software	Cable	USB Adapter	Terminator
IR	E-MI-AS-IR	10	E-SW-IR		E-A-PS-USB/IR	
PS	AES	30	E-SW-BASIC	E-C-PS-DB9/M12	E-A-PS-USB/DB9	
	AERS, TERS, TES, LES	31				
	TES, LES with SP, SF, SL options	31	E-SW-BASIC/PQ			
	TEZ, LEZ	10	Z-SW-FULL			
	Z-ME-KZ-PS	10 or higher		E-C-PS-DB9/DB9		
NP	E-BM-TID, E-BM-LID	10	E-SW-BASIC	E-C-SB-USB/BM	E-A-SB-USB/OPT	
BP	AES	30	E-SW-FIELDBUS	E-C-PS-DB9/M12	E-A-PS-USB/DB9	
	AERS, TERS, TES, LES	31		E-C-BP-DB9/M12	E-A-BP-USB/DB9	E-TRM-BP-DB9/DB9
	TES, LES with SP, SF, SL options	31	E-SW-FIELDBUS/PQ			
	TEZ, LEZ	10	Z-SW-FULL			
	Z-ME-KZ-PS/BP	10 or higher		E-C-PS-DB9/DB9	E-A-PS-USB/DB9	
BC	AES	30	E-SW-FIELDBUS	E-C-PS-DB9/M12	E-A-PS-USB/DB9	
	AERS, TERS, TES, LES	31		E-C-BC-DB9/M12	E-A-BC-USB/DB9	E-TRM-BC-DB9/DB9
	TES, LES with SP, SF, SL options	31	E-SW-FIELDBUS/PQ			
	TEZ, LEZ	10	Z-SW-FULL			
EH	AES	30	E-SW-FIELDBUS	E-C-PS-DB9/M12	E-A-PS-USB/DB9	

9.3 Obsolete ex-proof electronics

	Model Code	Series	Software	Cable	USB Adapter	Terminator
PS	AES	30	E-SW-BASIC	E-C-PS-DB9/M8	E-A-PS-USB/DB9	
	AERS, TERS, TES, LES	31				
BP	AES	30	E-SW-FIELDBUS	E-C-PS-DB9/M8	E-A-PS-USB/DB9	
	AERS, TERS, TES, LES	31		E-C-BP-DB9/RA	E-A-BP-USB/DB9	E-TRM-BP-DB9/DB9
BC	AES	30		E-C-PS-DB9/M8	E-A-PS-USB/DB9	
	AERS, TERS, TES, LES	31		E-C-BC-DB9/RA	E-A-BC-USB/DB9	E-TRM-BC-DB9/DB9